

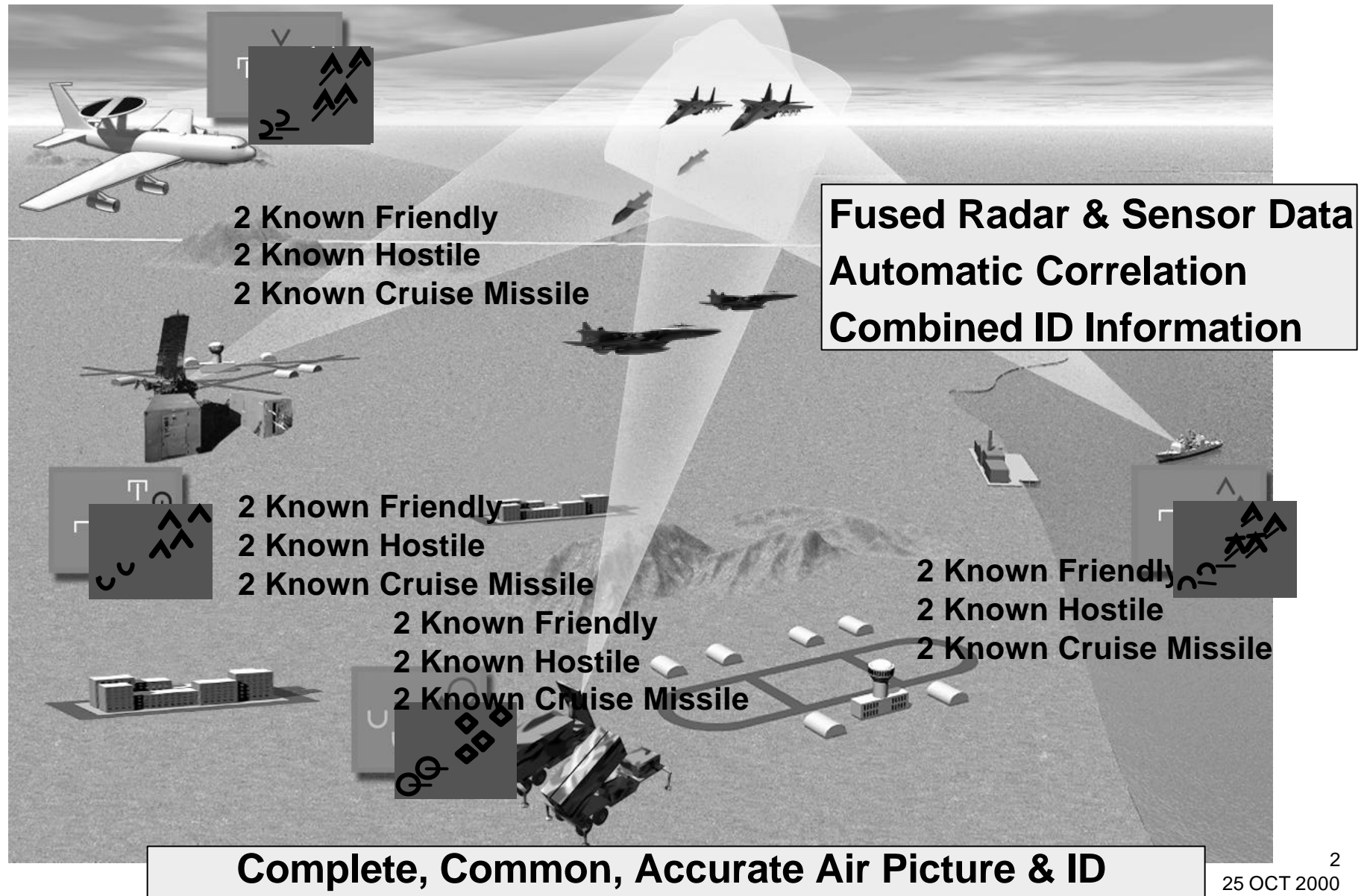


System Engineering
Applied to the
Single Integrated Air Picture (SIAP)
Presentation to National Defense Industrial Association

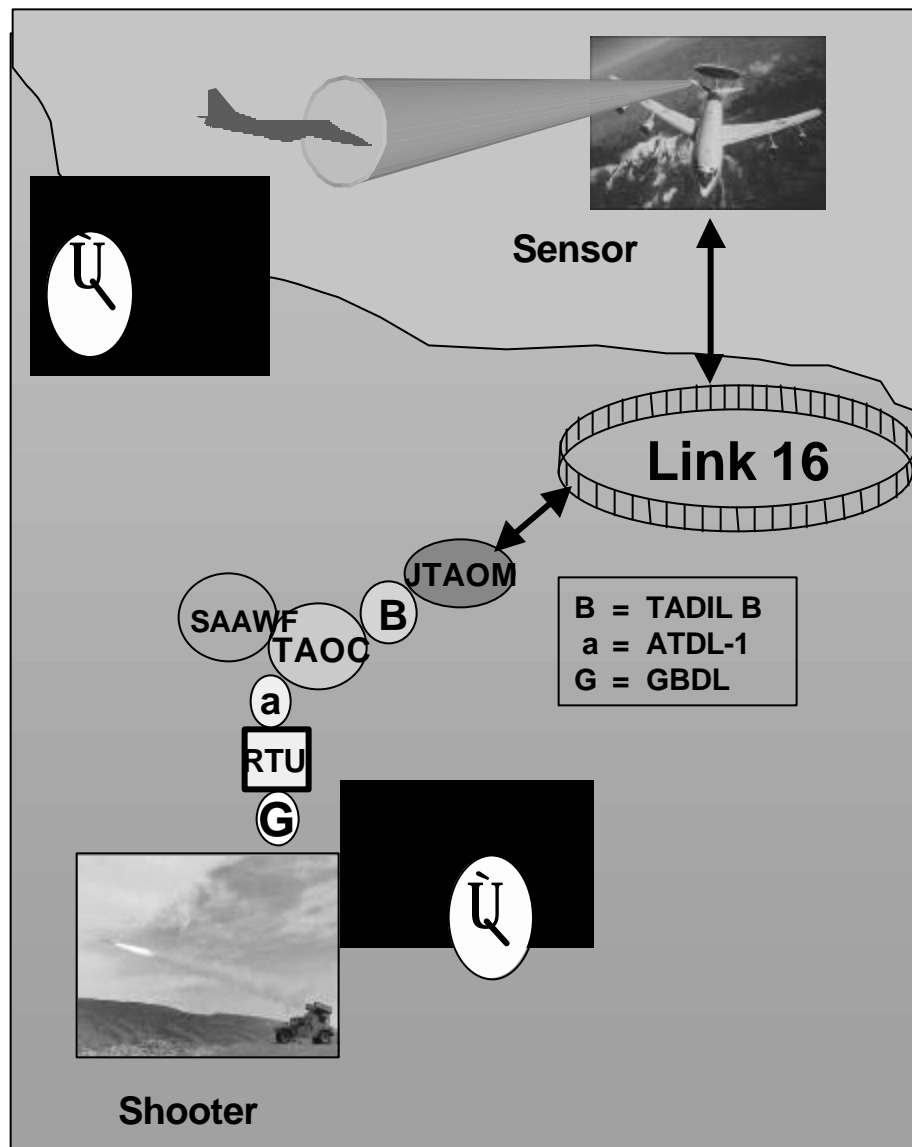
25 October 2000

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JTAMDO: The SIAP vision 2010

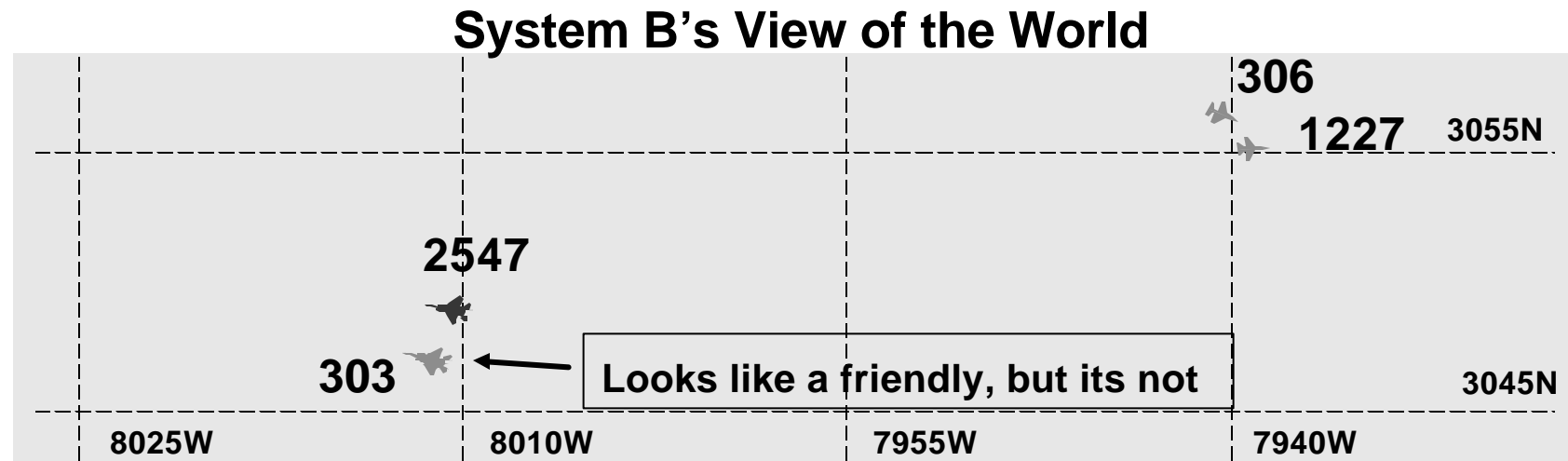
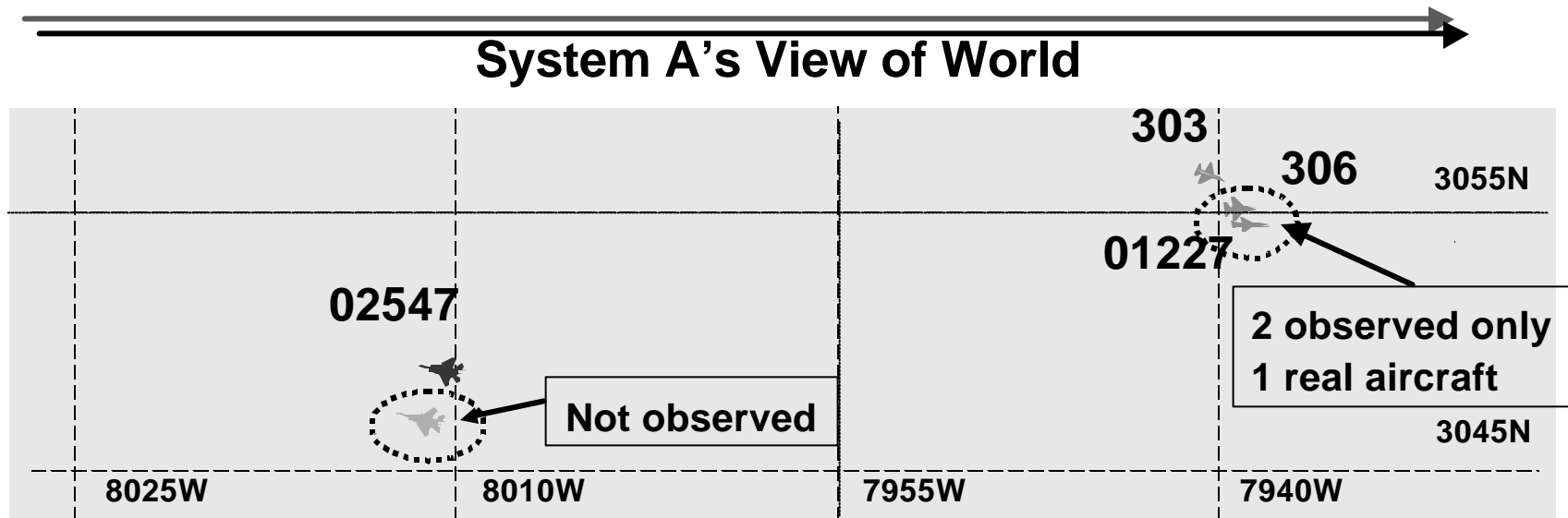


What the warfighter sees...



- Erratic tracking
- Dual/multiple track designations
- Misidentification/Track ID conflicts
- IFF/SIF conflicts
- Reporting responsibility (R2) conflicts
- Frequent track number changes and swaps
- Reliance on voice deconfliction
- Operator overload

Problem statement

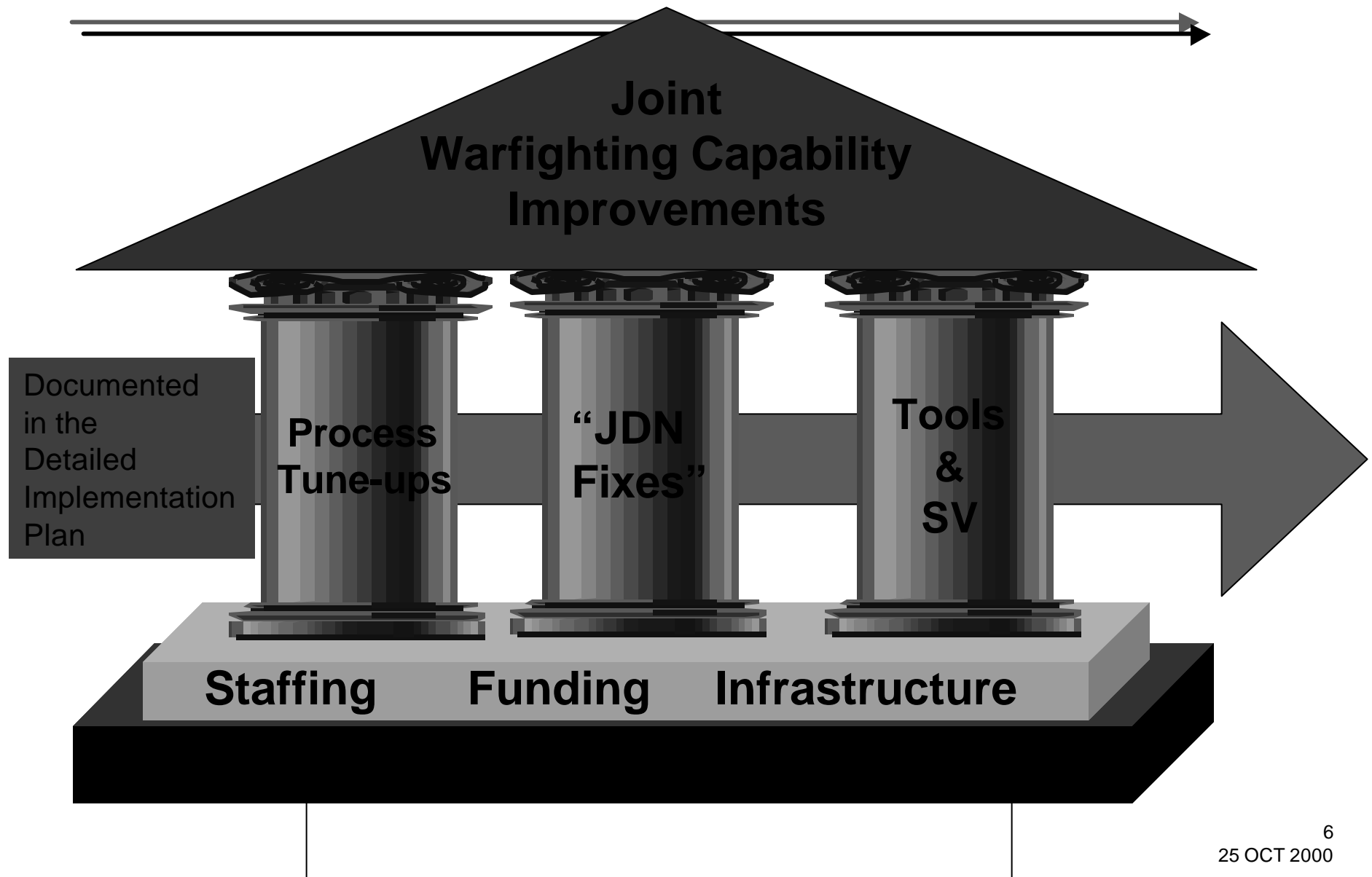


The Facts: Everyone's NOT on the same sheet of music

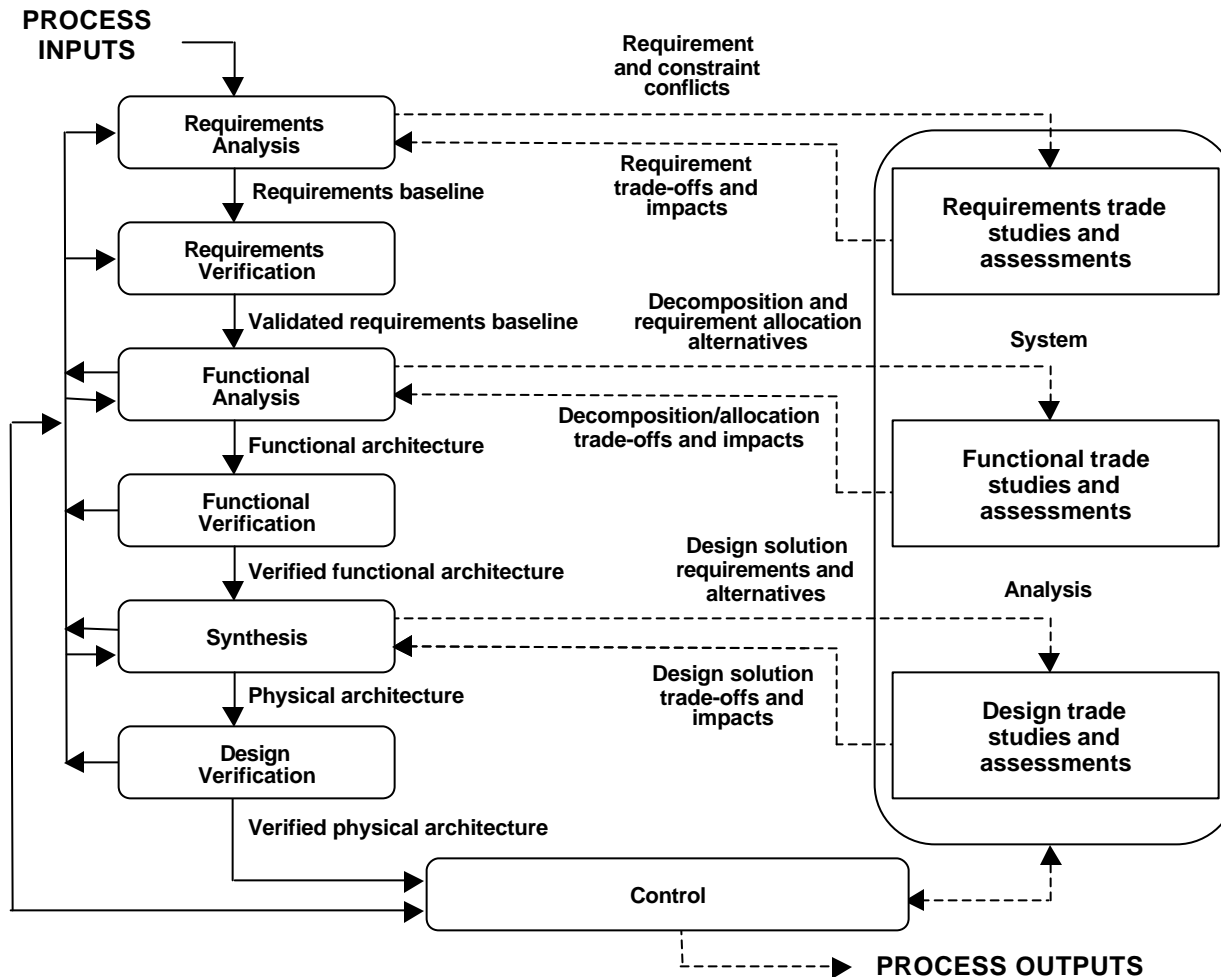
SIAP System Engineering Task Force Charter

- Initial focus of SIAP SE TF is to
 - **Establish a disciplined system engineering process to develop and integrate SIAP recommendations**
 - Develop recommendations for near-term Joint Data Network (JDN) improvements on the path to a SIAP capability
 - Measurable Product: “JDN” Fixes
 - Lead development of the system and technical views for the SIAP component of the TAMD integrated architecture
 - Measurable Product: System and Technical Views

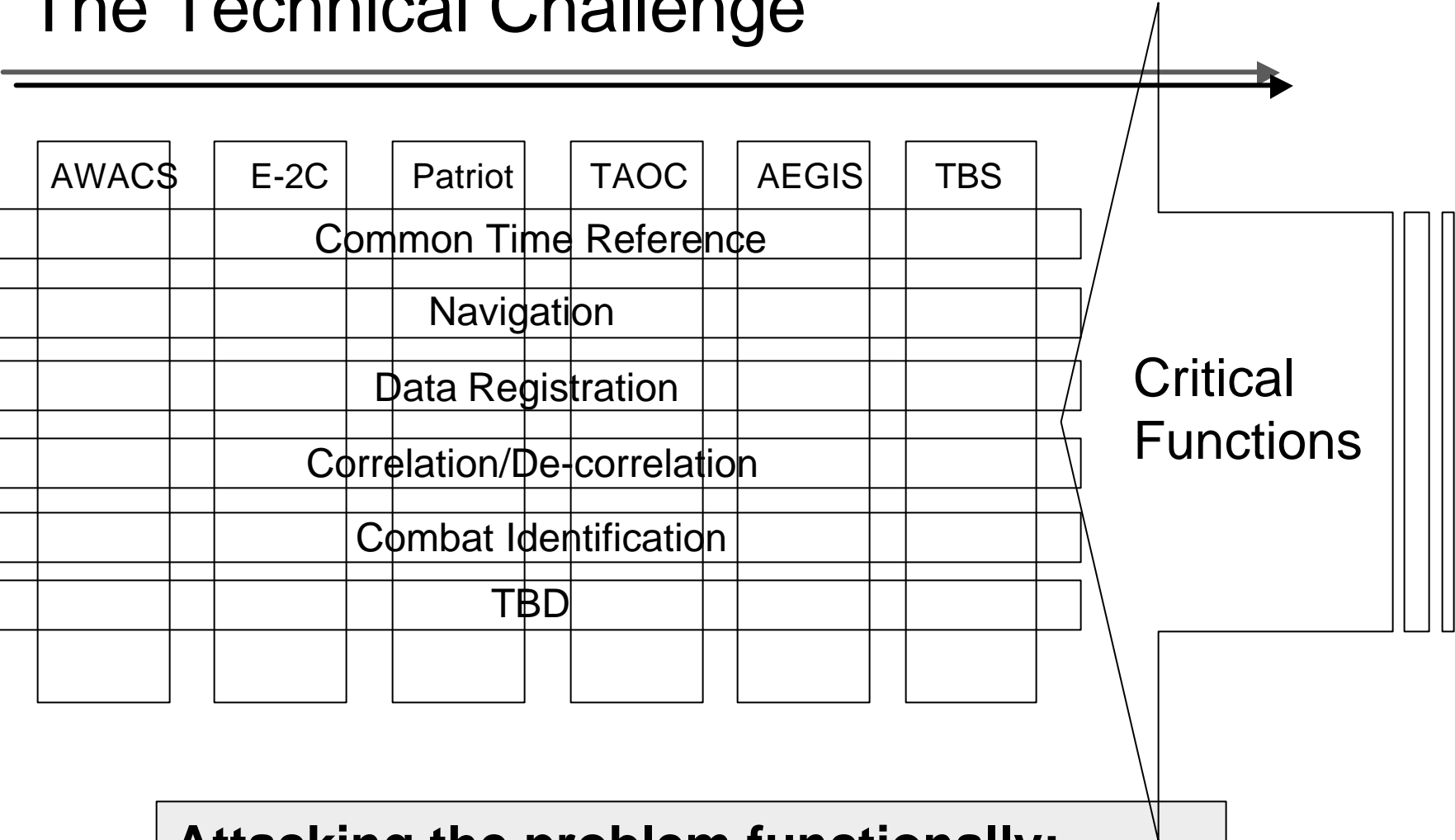
The Construct



System Engineering Process



The Technical Challenge



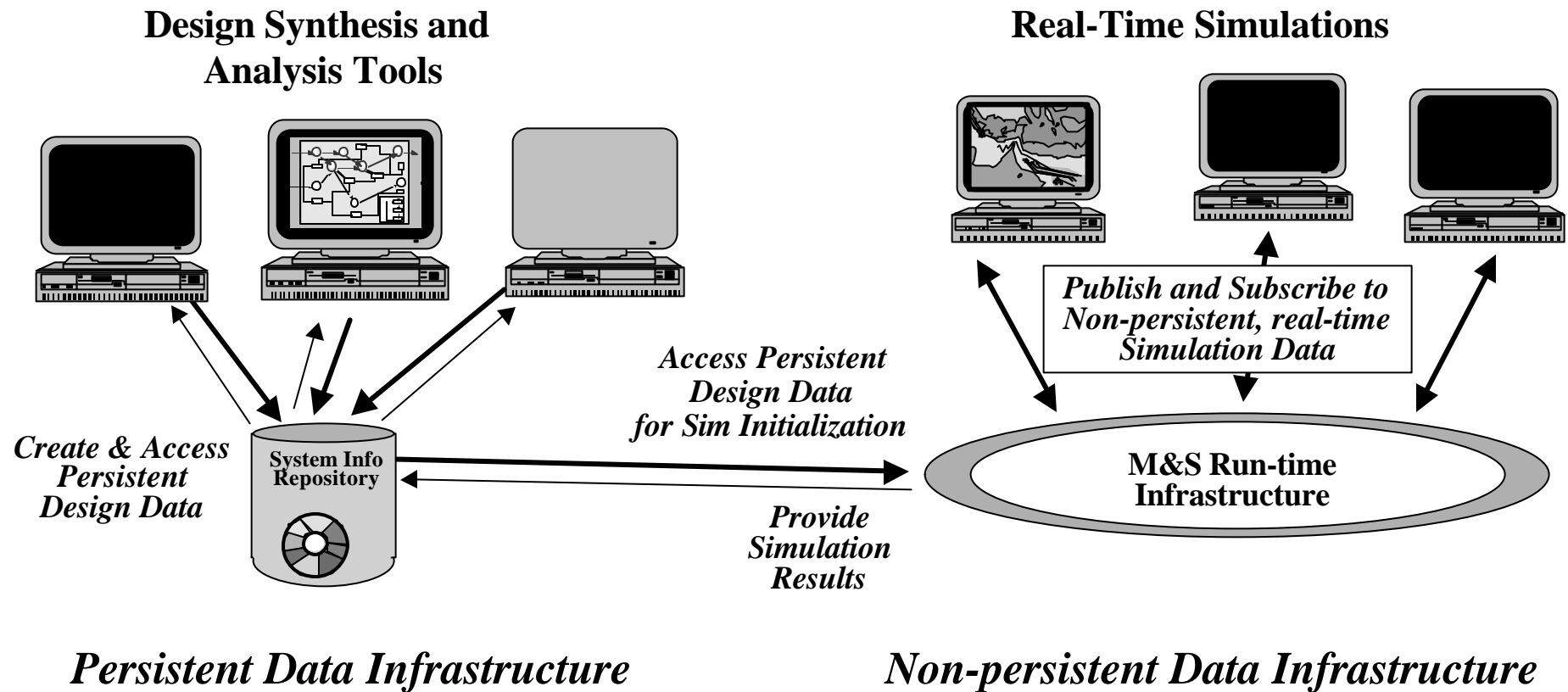
	AWACS	E-2C	Patriot	TAOC	AEGIS	TBS
			Common Time Reference			
			Navigation			
			Data Registration			
			Correlation/De-correlation			
			Combat Identification			
			TBD			

Critical Functions

Attacking the problem functionally:

- At a place/scope we can afford;
- That culminates fidelity WRT time

Collaborative Engineering Environment (CEE)

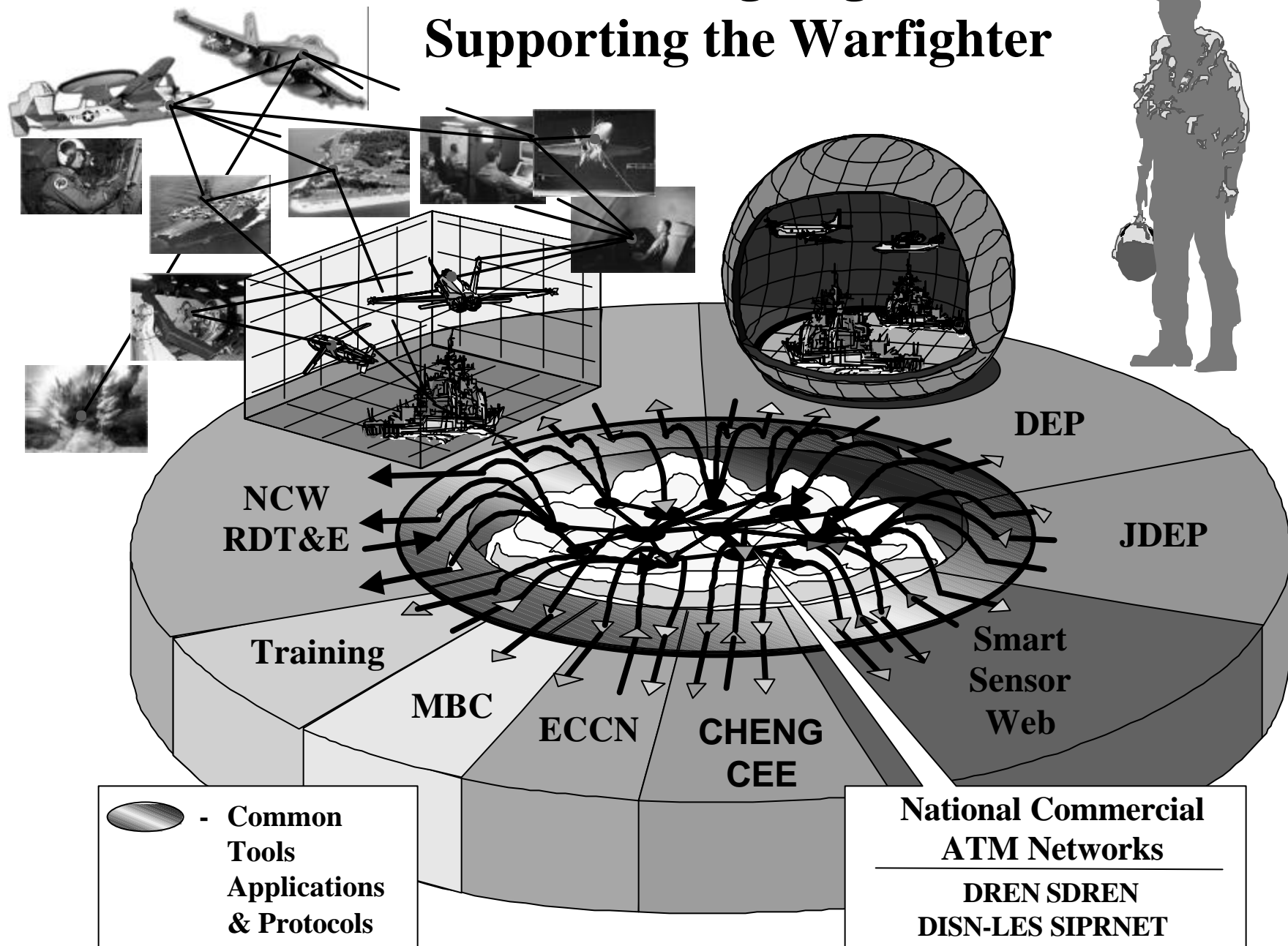


SE tools focus on reuse and interoperability of persistent design type data
M&S Tools focus on real-time publish/subscribe of sim messages like entity state

Collaborative Engineering Environment

- Purpose: Define use cases, management approach, operations and support requirements, stakeholder roles.
- Integration and Interoperability Collaboration Capability - Supports collaboration across distributed users for file and document sharing; access to relevant data base repositories; data, voice and video conferencing.
- Collaborative Engineering Environment (CEE) - Supports collaboration across distributed users for engineering and management data at the object level. Will initially be implemented using commercial tools and object repository as well as existing simulations and data bases.
- Interoperability Tools – Identify, assess, and deploy selected complex systems Interoperability assessment and simulation tools.

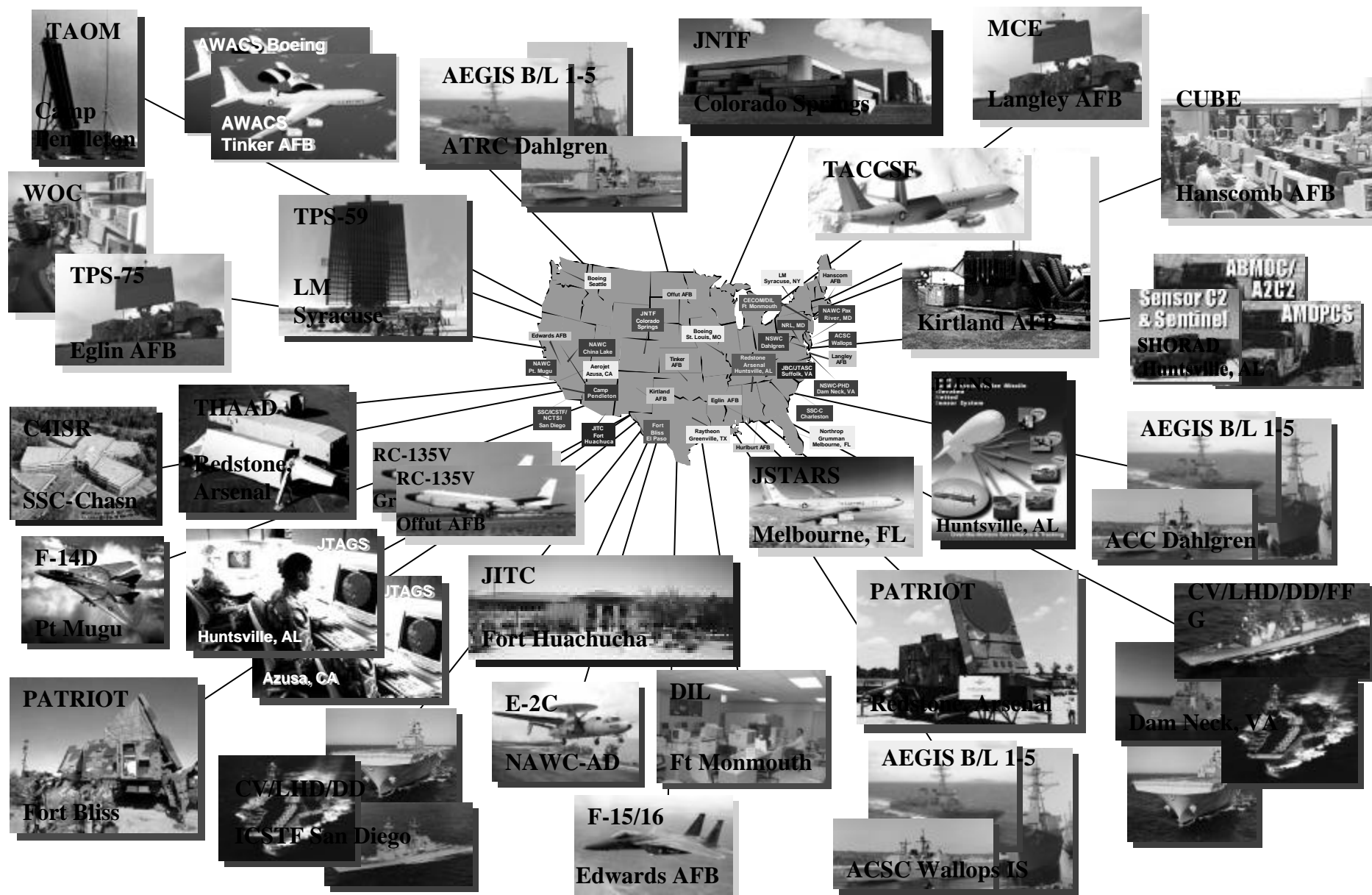
Networking Together Supporting the Warfighter



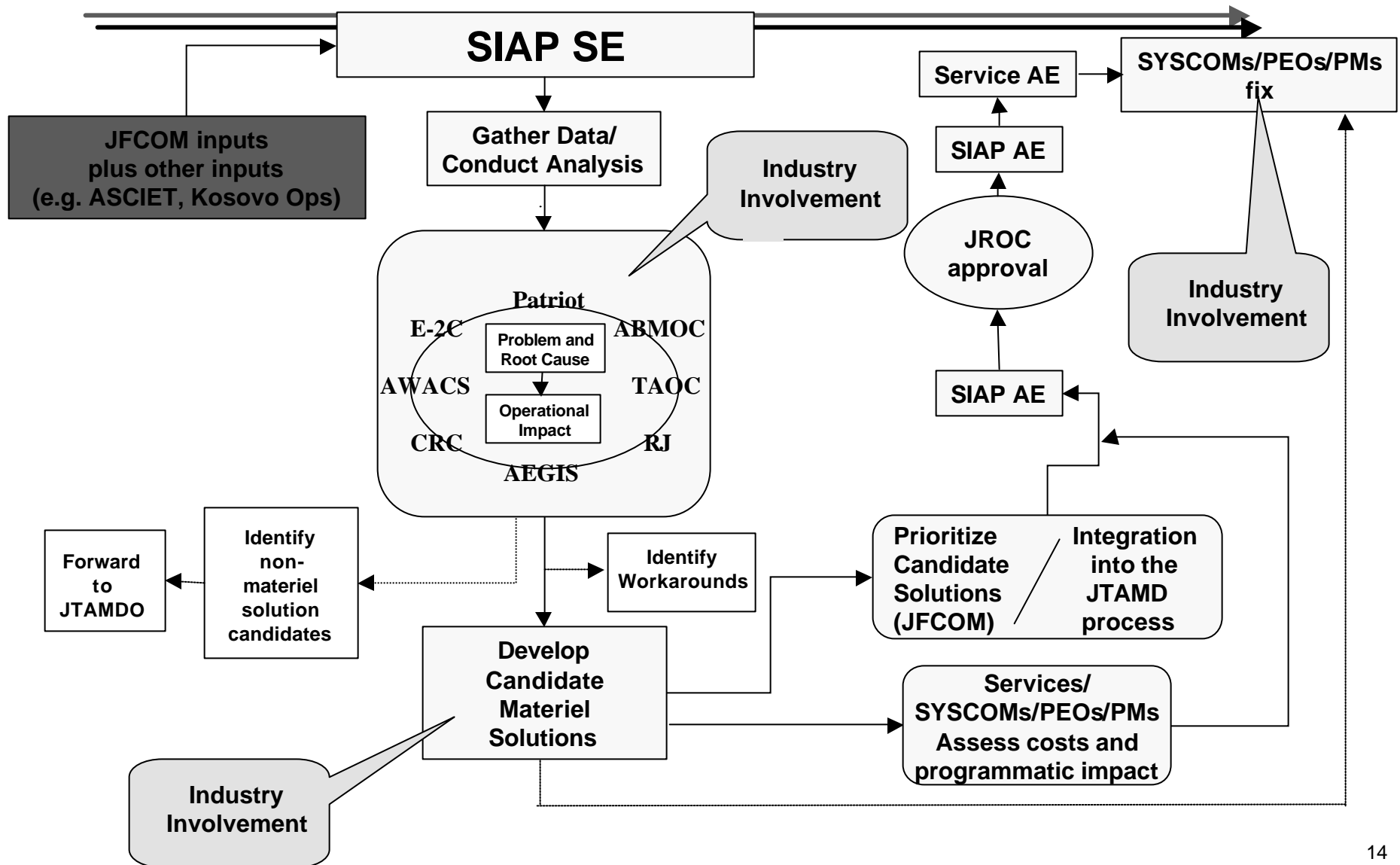
Near-term approach

- Objectively examine JDN-related processes whose health is essential to the warfighting mission
 - Example: JINTACCS
 - Identify ways of improving those processes
- Support “triage” efforts to make what we have all it can be within limited resources available
- Build, validate and implement a roadmap
 - Develop detailed cost estimates
 - Trade costs against warfighting benefits
 - Allocate resources to fix those problems that yield greatest “bang for the buck”
 - Verify and validate “fixes” using the JDEP

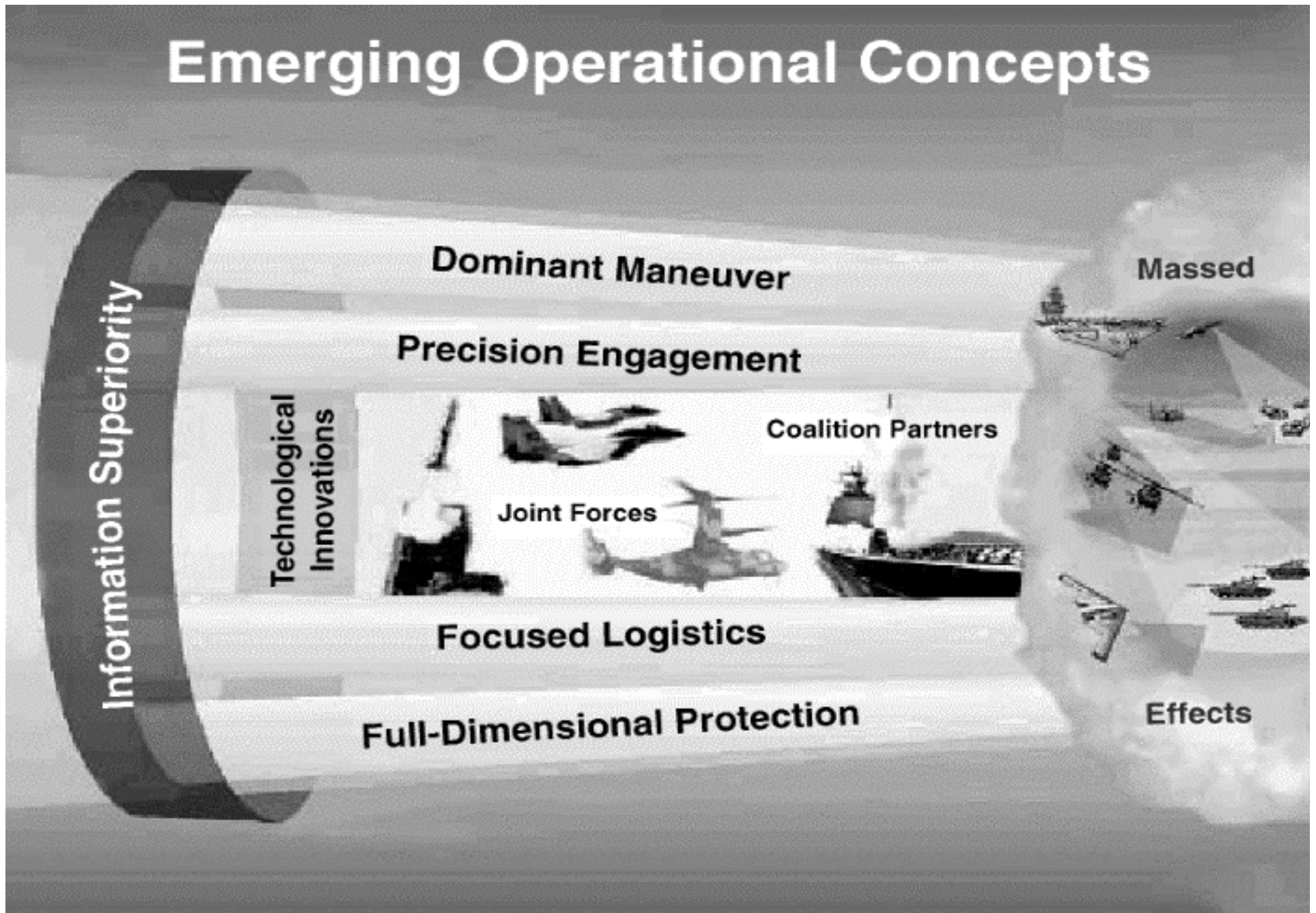
JDEP concept



JDN Fixes: The Process



Joint Vision 2010 Pillars



SV and TV for the SIAP component of the TADM Integrated Architecture

- Clinger-Cohen Act requires architecture
- Using C4ISR Framework Document 2.0 as guide
 - TAMD OA being generated by JTAMDO
 - BMDO generating SV and TV for TAMD Integrated Architecture (IA)
 - SIAP SE TF responsible for SIAP component of TAMD IA
- BMDO and SIAP SE TF have agreed on the following commercially available tools:
 - System Architecture 2001
 - Bonapart
 - Rationale Rose Suite

Controls

- Pressure points -- find and correct problems as early in the process as possible
 - Standards generation and configuration control process
 - Allocation of resources for time-phased, synchronized implementation of changes and fixes to existing shortfalls
 - Use configuration status accounting to understand configurations and operational impacts of configuration differences
 - Assess capability objectively and make fielding decisions based on that assessment

Summary

- Establish collaborative system engineering process
 - Ensures early Service participation for creating a Joint solution
 - Lowers life cycle costs by reducing rework to resolve interoperability problems in fielded systems
- Develop recommendations for near-term Joint Data Network (JDN) improvements
- Lead development of the system and technical views for the SIAP component of the TAMD integrated architecture

“The product of the SIAP SE recommendations will be combat ready, operationally certified equipment and computer programs that enable the warfighter to build and maintain a SIAP.”

?S

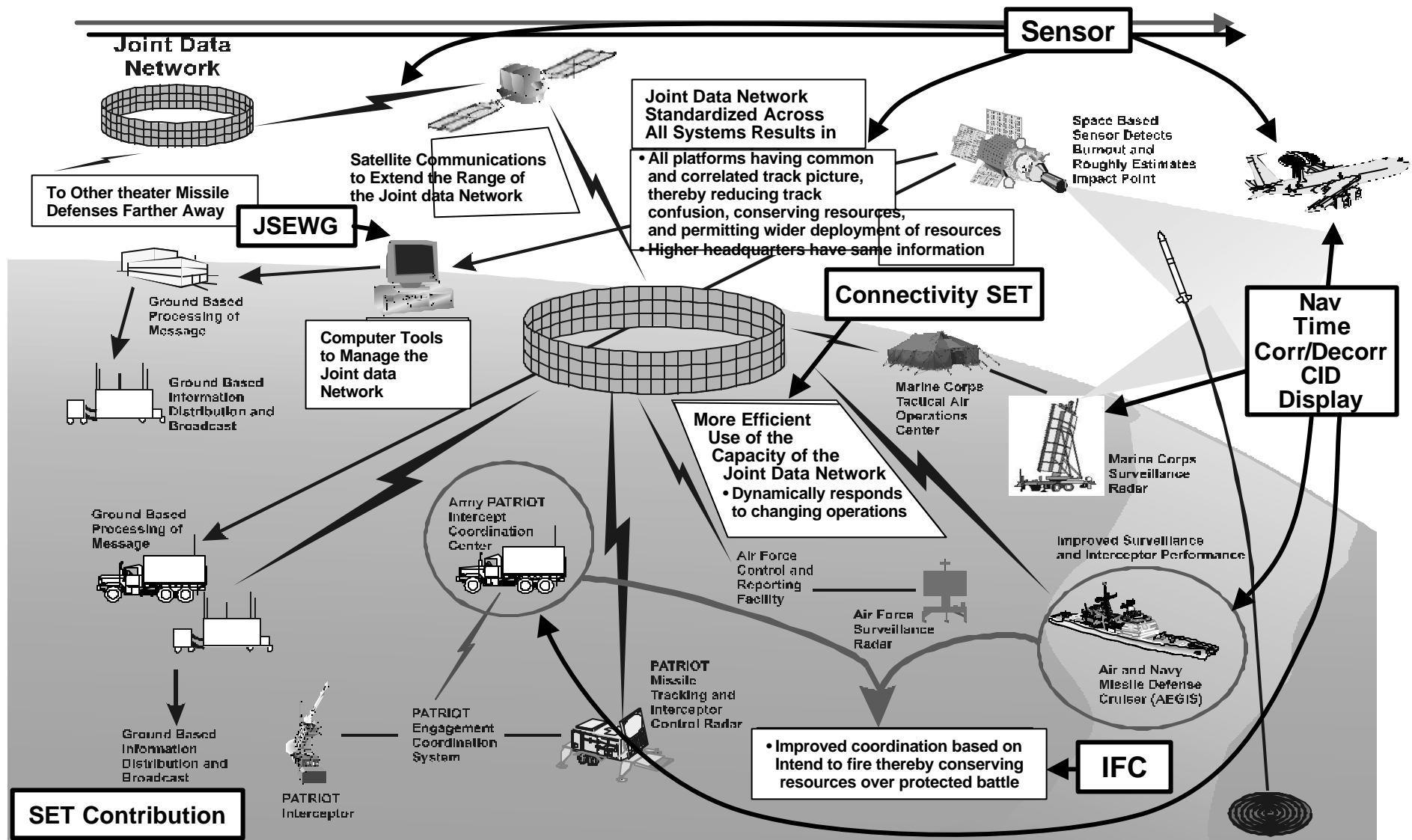
BACK UP SLIDES

Single Integrated Air Picture (SIAP) definition

- “The SIAP is the product of fused, near-real-time and real-time data from multiple sensors to allow development of common, continuous, and unambiguous tracks of all airborne objects in the surveillance area.”*
 - All airborne objects must be detected, tracked, and reported
 - Each object must have one and only one track identifier and associated characteristics
 - Scaleable and filterable
 - Incorporate the products of the combat identification process
 - Derived from NRT and RT data (including fire-control quality data), provided by JDN and JCTN
 - For RT data, the delay time must be no more than 0.5 sec

**Capstone Requirements Document (CRD) for Theater Missile Defense dtd Jul 98*

SIAP potential improvements



With proper investments, tomorrow's situation meets the warfighter's needs

SIAP Activities Status

- SIAP “New Start”
 - New Start package approved by HAC and SASC
 - Further Congressional briefs being scheduled
 - Funding delays have slowed progress
- SIAP Charter
 - Signed by CIO and VCJCS and on track for USD (AT&L) approval and DEPSECDEF endorsement
 - Produced in coordination with the Services, JTAMDO and BMDO

Engineering Issues Decision Process

